

WHAT IS CLAIMED IS:

1. A data compression system for compressing an original time series data with a various waveform, comprising:

5 a compression unit that compresses the original time series data without damaging characteristics of a waveform information in the various waveform, said waveform information including a signal with a various change; and

10 an encoding unit that encodes the compressed time series data to generate a compression code.

2. The data compression system according to claim 1, wherein said signal with the various change includes one of a step-like signal change and a local signal average value, and  
15 wherein said compression unit compresses the original time series data without damaging a waveform information on non-stationary behavior thereof.

3. The data compression system according to claim 1,  
20 wherein said compression unit performs a wavelet transform to the original time series data by using a transform coefficients to decompose the original time series data into a predetermined level numbers of component waveforms, each of said component waveforms of each level having local peak value data; and  
25 extracts at least one of the local peak value data of each of the component waveforms, said extracted local peak value data

having an absolute value which is not less than a predetermined threshold value, and

wherein said encoding unit encodes the extracted local peak value data of each of the component waveforms of each of the levels on the basis of information used for the decomposition of the compression unit to generate the compression code.

4. The data compression system according to claim 3, wherein said extracted peak value data includes a peak value thereof and a position in a data-frame of each level thereof, and said information used for the decomposition includes a mother wavelet function, a total number of the levels and one of the component waveforms having a low frequency of a final level, one of said component waveforms having the low frequency of the final level is one of a smoothed signal value and an average value of the original time series data.

5. The data compression system according to claim 1, wherein said encoding unit transmits the compression code through a network, further comprising a decompression unit that is intercommunicated through the network with the encoding unit and receives the transmitted compression code to decompress the received compression code, thereby reconstructing the characteristics of said waveform information of the original time series data.

6. The data compression system according to claim 3,  
wherein said encoding unit transmits the compression code  
through a network, further comprising a decompression unit that  
is intercommunicated through the network with the encoding unit,  
said decompression unit comprising:

a receiving unit that receives the transmitted  
compression code; and

an inverse wavelet transform unit that performs an  
inverse wavelet transform to the compression code to reconstruct  
a time series data having the characteristics of said waveform  
information of the original time series data.

7. The data compression system according to claim 3,  
wherein said original time series data includes first time  
series data and second time series data, said first and second  
time series data having a correlation of input and output as a  
control model with each other, said first time series data  
corresponding to the input, said second time series data  
corresponding to the output,

said compression unit performs the wavelet transform to  
the first original time series data by using the transform  
coefficients to decompose the first original time series data  
into a predetermined level numbers of component waveforms, each  
of said component waveforms of each level having local peak  
value data; extracts at least one of the local peak value data

of each of the component waveforms, said extracted local peak value data having an absolute value which is not less than a predetermined threshold value; and generates a model parameter on the basis of the control model identifying the correlation of input and output, and

wherein said encoding unit encodes the extracted local peak value data of each of the component waveforms of each of the levels of the first time series data on the basis of information used for the decomposition of the compression unit to generate a first compression code; generates the compression code corresponding to the original time series data on the basis of the generated first compression data corresponding to the first time series data and the generated model parameter corresponding to the second time series data; and transmits the generated compression code through a communication network, further comprising a decompression unit that is intercommunicated through the communication network with the encoding unit, said decompression unit comprising:

a receiving unit that receives the transmitted compression code to separate the first compression code and the model parameter;

an inverse wavelet transform unit that performs a an inverse wavelet transform to the first compression code to reconstruct the first time series data corresponding to the input; and

a reconstruction unit that reconstructs, on the basis of

the control model, the reproduced first time series data and the model parameter, the second time series data.

8. The data compression system according to claim 6,  
5 wherein said compression unit refers a mother wavelet code transform table by using a predetermined mother wavelet function to extract a transform code corresponding to the predetermined mother wavelet function and compresses the original time series data by using the extracted transform code, and wherein said  
10 inverse wavelet transform unit stores thereon the mother wavelet code transform table, refers the mother wavelet code transform table by using the transform code of the compression code to extract the predetermined mother wavelet function and decompresses the compression code by using the predetermined  
15 mother wavelet code.

9. The data compression system according to claim 8,  
further comprising a storing unit that stores thereon a mother wavelet code transform table, wherein said compression unit,  
20 when referring the mother wavelet function table, inquires the transform code of the storing unit by using the predetermined mother wavelet function to extract the transform code issued by the storing unit on the basis of the wavelet code transform table, and wherein said decompression unit, when referring the  
25 mother wavelet function, inquires the mother wavelet function of the storing unit by using the transform code to extract the

mother wavelet function issued by the storing unit on the basis of the wavelet code transform table.

10. The data compression system according to claim 6,  
5 wherein said decompression unit presents compression conditions for each cutting out of the original data to the compression unit through the network on the basis of a supervisory result of the reconstructed time series data based on the original time series data, said compression unit, according to the presented  
10 compression conditions, compresses the original time series data according to the compression conditions, said encoding unit generates the compression code on the basis of the compressed time series data to transmit the compression code through the network to the decompression unit, and wherein said  
15 decompression unit sequentially decompresses the transmitted compression code to display thereon the decompressed data.

11. The data compression system according to claim 6,  
wherein said compression unit, for each cutting out of the  
20 original time series data, assembles the local peak values of the respective component waveforms of the respective levels of in their respective frequencies so as to generate compression codes on the basis of the respective assembled local peak values, said compression codes correspondingly including the respective  
25 assembled local peak values, and sequentially transmits the compression codes, starting from one of the compression codes

corresponding to the lowest frequency up to one of the compression codes corresponding to the highest frequency, and wherein said decompression unit receives the sequentially transmitted compression codes to reconstruct each of the compression codes, thereby sequentially displaying the reconstructed compression codes.

12. The data compression system according to claim 6, wherein said compression unit, for each cutting out of the original time series data, assembles the local peak values of the respective transform coefficients by using one of the threshold values which is sequentially selected in threshold values in descending order so that each of absolute values of each of the assembled groups of local peak values is larger than each of the selected one of the threshold values to generate compression codes on the basis of the respective assembled groups of the local peak values, said compression codes correspondingly including the respective assembled local peak values, and sequentially transmits the compression codes, starting from one of the compression codes corresponding to the largest threshold value up to one of the compression codes corresponding to the lowest threshold value, and wherein said decompression unit receives the sequentially transmitted compression codes to reconstruct each of the compression codes, thereby sequentially displaying the reconstructed compression codes.

13. The data compression system according to claim 6,  
wherein said compression unit comprises a first means, for each  
cutting out of the original time series data, that assembles the  
5 local peak values of the respective component waveforms of the  
respective levels in their respective frequencies to generate  
compression codes on the basis of the respective assembled local  
peak values, said compression codes correspondingly including  
the respective assembled local peak values, and sequentially  
10 transmits the compression codes, starting from one of the  
compression codes corresponding to the lowest frequency up to  
one of the compression codes corresponding to the highest  
frequency; and a second means, for each cutting out of the  
original time series data, assembles the local peak values of  
15 the respective transform coefficients by using one of the  
threshold values which is sequentially selected in threshold  
values in descending order so that each of absolute values of  
each of the assembled groups of local peak values is larger than  
each of the selected one of the threshold values to generate  
20 compression codes on the basis of the respective assembled  
groups of the local peak values, said compression codes  
correspondingly including the respective assembled local peak  
values, and sequentially transmits the compression codes,  
starting from one of the compression codes corresponding to the  
25 largest threshold value up to one of the compression codes  
corresponding to the lowest threshold value, and wherein said



decompression unit receives the sequentially transmitted compression codes so as to reconstruct each of the compression codes, thereby sequentially displaying the reconstructed compression codes.

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14. The data compression system according to claim 13, when detecting a signal change as for the original time series data on the basis of each waveform component of each level of the original time series data, wherein said compression unit generates the compression codes by using one of the first and second means to transmit the generated compression codes, said decompression unit receives each of the compression codes to reconstruct each of the compression codes of each decomposition level thereby sequentially displaying the reconstructed compression codes, and evaluate, on the basis of the reconstructed time series data, validity of a control model to transmit the evaluated result to the compression unit, if necessary, reconstruct the control model and transmit the model parameter to the compression unit, and wherein said compression unit update the control model to improve control performance thereof.

15. A supervisory control system for a supervisory control of an object unit according to an original time series data thereof, said original time series data with a various waveform, said system comprising:

a compression unit that compresses the original time series data without damaging characteristics of a waveform information in the various waveform, said waveform information including a signal with a various change;

5 an encoding unit that encodes the compressed time series data so as to generate a compression code, thereby transmitting the compression code through a communication network; and

a decompression unit that is intercommunicated through the communication network with the encoding unit and receives the transmitted compression code so as to decompress the received compression code, thereby reconstructing the characteristics of waveform information of the original time series data.

15 16. A data decompression system comprising:

a receiving unit that receives a compression code,

said compression code being obtained by compressing an original time series data without damaging characteristics of waveform information in a various waveform thereof, said waveform information including a signal with a various change; and

a decompression unit that decompresses the received compression code, thereby reconstructing the characteristics of said waveform information of the original time series data.

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17. A computer-readable storage medium comprising:

means for causing a computer to compress an original time series data with a various waveform without damaging characteristics of waveform information in the various waveform, said waveform information including a signal with a various change; and

means for causing a computer to encode the compressed time series data so as to generate a compression code.

18. A computer-readable storage medium comprising:

means for causing a computer to receive a compression code,

said compression code being obtained by compressing an original time series data without damaging characteristics of waveform information in a various waveform, said waveform information including a signal with a various change; and

means for causing a computer to decompress the received compression code, thereby reconstructing the characteristics of said waveform information of the original time series data.

19. A method of compressing an original time series data with a various waveform, comprising the steps of:

compressing the original time series data without damaging characteristics of a waveform information in the signal waveform, said waveform information including a signal with a various change; and

encoding the compressed time series data to generate a

